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Message:

Enclosed herewith:

- Transmittal Document; and
- Appeal Brief.

Re: Application No. **09/942,747**
Attorney Docket No: **AUS920010489US1**

Date: Thursday, June 15, 2006

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Graham et al.**

Serial No.: **09/942,747**

Filed: **August 30, 2001**

For: **IP Datagram Over Multiple Queue Pairs**

35525
PATENT TRADEMARK OFFICE CUSTOMER NUMBER

§ Group Art Unit: **2665**
§
§ Examiner: **Davis, Cynthia L.**
§
§ Attorney Docket No.: **AUS920010489US1**
§

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By: Jennifer Pilcher
Jennifer Pilcher

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- Appeal Brief (37 C.F.R. 41.37)

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Respectfully submitted,

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Docket No. AUS920010489US1 ***PATENT***

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Graham et al.**	§	
	§	Group Art Unit: **2665**
Serial No. **09/942,747**	§	
	§	Examiner: **Davis, Cynthia L.**
Filed: **August 30, 2001**	§	
	§	
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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By: Jennifer Pilcher

APPEAL BRIEF (37 C.F.R. 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on April 24, 2006.

The fees required under § 41.20(B)(2), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

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REAL PARTY IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines Corporation.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1-30

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: NONE
2. Claims withdrawn from consideration but not canceled: NONE
3. Claims pending: 1-30
4. Claims allowed: NONE
5. Claims rejected: 1-30
6. Claims objected to: NONE

C. CLAIMS ON APPEAL

The claims on appeal are: 1-30

STATUS OF AMENDMENTS

No amendments were made after the Final Office Action dated August 8, 2005.

SUMMARY OF CLAIMED SUBJECT MATTER

A. CLAIM 1 - INDEPENDENT

The subject matter of claim 1 is directed to method of routing data packets to a queue pair. A data packet (**712**, **1083**) is received. The data packet has a header (**718**) in which one or more Internet Protocol filter values are identified (see *Specification*, page 25, line 12, through page 26, line 3). A queue pair (**824**, **828**, **1005**) in a plurality of queue pairs is identified based on the one or more Internet Protocol filter values in the header of the data packet (see *Specification*, page 4, lines 14-23, and page 35, lines 19-28). A single channel adapter (**300A**, **806**, **1023**) supports the plurality of queue pairs (see *Specification*, page 4, lines 3-6, and page 15, lines 15-26). The data packet is routed to the identified queue pair (see *Specification*, page 4, lines 23-26, page 31, lines 18, through page 32, line 13).

B. CLAIM 11 - INDEPENDENT

The subject matter of claim 11 is directed to computer program product in a computer readable medium for routing data packets to a queue pair. The computer program product provides first instructions for receiving a data packet (**712**, **1083**) having a header (**718**) in which one or more Internet Protocol filter values are identified (see *Specification*, page 25, line 12, through page 26, line 3). The computer program product provides second instructions for identifying a queue pair (**824**, **828**, **1005**) in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet (see *Specification*, page 4, lines 14-23, and page 35, lines 19-28). A single channel adapter (**300A**, **806**, **1023**) supports the plurality of queue pairs (see *Specification*, page 4, lines 3-6, and page 15, lines 15-26). The computer program product provides third instructions for routing the data packet to the identified queue pair (see *Specification*, page 4, lines 23-26, page 31, lines 18, through page 32, line 13).

C. CLAIM 21 - INDEPENDENT

The subject matter of claim 21 is directed to an apparatus for routing data packets to a queue pair. The apparatus provides a means for receiving a data packet (**712, 1083**) having a header (**718**) in which one or more Internet Protocol filter values are identified (see *Specification*, page 25, line 12, through page 26, line 3). The apparatus provides a means for identifying a queue pair (**824, 828, 1005**) in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet (see *Specification*, page 4, lines 14-23, and page 35, lines 19-28). A single channel adapter (**300A, 806, 1023**) supports the plurality of queue pairs (see *Specification*, page 4, lines 3-6, and page 15, lines 15-26). The apparatus provides a means for routing the data packet to the identified queue pair (see *Specification*, page 4, lines 23-26, page 31, lines 18, through page 32, line 13).

D. CLAIM 4 - DEPENDENT

The subject matter of claim 4, which depends from claim 1 through dependent claims 2 and 3, is directed to a method further comprising comparing the one or more Internet Protocol filter values in the header of the data packet (**1083**) to filter values in a collision table (**1050**) entry and identifying the queue pair (**1005**) based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry (see *Specification*, page 35, lines 19-28).

E. CLAIM 10 - DEPENDENT

The subject matter of claim 10, which depends from claim 1, is directed to a method wherein identifying the queue pair (**1005**) in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet (**1083**) includes using a content addressable memory (see *Specification*, page 36, lines 23-30).

F. CLAIM 14 - DEPENDENT

The subject matter of claim 14, which depends from claim 11 through dependent claims 12 and 13, is directed to a computer program product further comprising instructions for comparing the

one or more Internet Protocol filter values in the header of the data packet (**1083**) to filter values in a collision table (**1050**) entry and instructions for identifying the queue pair (**1005**) based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry (see *Specification*, page 35, lines 19-28).

G. CLAIM 20 - DEPENDENT

The subject matter of claim 20, which depends from claim 11, is directed to a computer program product wherein the second instructions for identifying the queue pair (**1005**) in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet (**1083**) include instructions for using a content addressable memory (see *Specification*, page 36, lines 23-30).

H. CLAIM 24 - DEPENDENT

The subject matter of claim 24, which depends from claim 21 through dependent claims 22 and 23, is directed to an apparatus further comprising means for comparing the one or more Internet Protocol filter values in the header of the data packet (**1083**) to filter values in a collision table (**1050**) entry and means for identifying the queue pair (**1005**) based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry (see *Specification*, page 35, lines 19-28).

I. CLAIM 30 - DEPENDENT

The subject matter of claim 30, which depends from claim 21, is directed to an apparatus wherein the means for identifying the queue pair (**1005**) in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet (**1083**) includes means for using a content addressable memory (see *Specification*, page 36, lines 23-30).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. GROUND OF REJECTION 1 (Claims 1-4, 10-14, 20-24, and 30)

The Final Office Action rejects claims 1-4, 10-14, 20-24, and 30 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Spinney et al.* (U.S. Patent 5,390,173) in view of *Collier et al.* (U.S. Patent 6,732,318 B2).

B. GROUND OF REJECTION 2 (Claims 5-9, 15-19, and 25-29)

The Final Office Action rejects claims 5-9, 15-19, and 25-29 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Spinney et al.* (U.S. Patent 5,390,173) in view of *Collier et al.* (U.S. Patent 6,732,318 B2), and in further view of *Acharya* (U.S. Patent 6,459,698 B1).

ARGUMENT

A. GROUND OF REJECTION 1 (Claims 1-4, 10-14, 20-24, and 30)

The Final Office Action rejects claims 1-4, 10-14, 20-24, and 30 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Spinney et al.* (U.S. Patent 5,390,173), hereinafter referred to as *Spinney*, in view of *Collier et al.* (U.S. Patent 6,732,318 B2), hereinafter referred to as *Collier*. This rejection is respectfully traversed.

A.1. Claims 1-3, 11-13, and 21-23

As to independent claims 1, 11, and 21, the Final Office Action states:

> Regarding claim 1, receiving a data packet having a header which one or more Internet Protocol filter values are identified is disclosed in Spinney, column 1, lines 35-36 (disclosing a packet network using Ethernet, which uses IP) and column 14, lines 33-34 (disclosing filtering packets). Identifying a destination based on the one or more filter values in the header of the data packet; and routing the data packet to the identified destination is disclosed in column 2, lines 15-18 (disclosing routing packets by local address values, which are contained in the header). The destination being a queue pair in a plurality of queue pairs supported by a single channel adapter is missing from Spinney. However, Collier discloses in column 3, lines 15-17, a channel adapter supporting multiple queue pairs, and in column 3, lines 26-28, routing packets via the multiple queue pairs. It would have been obvious to one skilled in the art at the time of the invention to use to route the filtered packets of Spinney through the Infiniband adapter of Collier. The motivation would be to use the Infiniband architecture to connect multiple independent processor platforms (See Collier, column 2, lines 59-62).
>
> Regarding claim 11, a computer program product in a computer readable medium for routing data packets is disclosed in Spinney, column 1, lines 39-40 (disclosing that the system is implemented in a computer system). First instructions for receiving a data packet having a header which one or more IP filter values are identified is disclosed in Spinney, column 1, lines 35-36 (disclosing a packet network using Ethernet, which uses IP) and column 14, lines 33-34 (disclosing filtering packets). Second instructions for identifying a destination based on the one or more filter values in the header of the data packet, and third instructions for routing the data packet to the identified destination is disclosed in column 2, lines 15-18 (disclosing routing packets by local address values, which are contained in the header). The destination being a queue pair in a plurality of queue pairs supported by a single channel adapter is missing from Spinney. However, Collier discloses in column 3, lines 15-17, a channel adapter supporting multiple quere pairs, and in column 3, lines 26-28, routing packets via the multiple queue pairs. It would have been obvious to one skilled in the art at the time of the invention to route the filtered packets of Spinney through the Infiniband adapter of Collier. The motivation would be to

use the Infiniband architecture to connect multiple independent processor platforms (See Collier, column 2, lines 59-62).

Regarding claim 21, means for receiving a data packet having a header which one or more IP filter values are identified is disclosed in Spinney, column 1, lines 35-36 (disclosing a packet network using Ethernet, which uses IP) and column 14, lines 33-34 (disclosing filtering packets). Means for identifying a destination based on the one or more filter values in the header of the data packet; and means for routing the data packet to the identified destination is disclosed in column 2, lines 15-18 (disclosing routing packets by local address values, which are contained in the header). The destination being a queue pair in a plurality of queue pairs supported by a single channel adapter is missing from Spinney. However, Collier discloses in column 3, lines 15-17, a channel adapter supporting multiple queue pairs, and in column 3, lines 26-28, routing packets via the multiple queue pairs. It would have been obvious to one skilled in the art at the time of the invention to route the filtered packets of Spinney through the Infiniband adapter of Collier. The motivation would be to use the Infiniband architecture to connect multiple independent processor platforms (See Collier, column 2, lines 59-62).

Final Office Action dated August 8, 2005, pages 2-4.

Claim 1, which is representative of the other rejected independent claims 11, and 21 with regard to similarly recited subject matter, reads as follows:

1. A method of routing data packets to a queue pair, comprising:
receiving a data packet having a header in which one or more IP filter values are identified;
identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs; and
routing the data packet to the identified queue pair. (emphasis added)

The Examiner bears the burden of establishing a *prima facie* case of obviousness based on the prior art when rejecting claims under 35 U.S.C. § 103. *In re Fritch*, 972 F.2d 1260, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992). For an invention to be prima facie obvious, the prior art must teach or suggest all claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Neither *Spinney* nor *Collier*, taken individually or in combination, teaches or suggests "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs," as recited in claims 1, 11, and 21.

Spinney is directed to a packet format in a hub for a packet data communications system. A packet data communication network employs a local switch, router or bridge device functioning to transfer packets between segments of a large network. When packets enter this

device, an address translation is performed to generate local source and destination addresses, which are much shorter than the globally unique addresses contained in the packet as dictated by the protocol. These local addresses are inserted in a header that is added to the packet, in addition to any header already contained in the packet. This added header travels with the packet through the local switch, router or bridge device, but then is stripped off before the packet is sent out onto another network segment. The added header may also contain other information, such as a local name for the source and destination segment (link), as well as status information that is locally useful, but not part of the packet protocol and not necessary for transmission with the packet throughout the network. Examples of such status information include local congestion information, results of address translations, and end-of-message information. See *Spinney*, abstract. The Final Office Action states that the "destination being a queue pair in a plurality of queue pairs supported by a single channel adapter is missing from *Spinney*." Further, *Spinney* does not mention queue pairs. Thus, *Spinney* does not teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs," as recited in claims 1, 11, and 21.

In the rejection of independent claims 1, 11, and 21, the Final Office Action refers to the following portions of *Spinney*:

> Packet data communication networks of type using Ethernet, token ring, or FDDI technologies, or other network varieties, hubs are used for switching or routing, or for bridges to additional segments of the network.

Spinney, column 1, lines 35-36.

> These local addresses are inserted in a header that is added to the packet, in addition to any header already contained in the packet. This added header travels with the packet through the local switch, router or bridge device, but then is stripped off before the packet is sent out onto another network segment.

Spinney, column 2, lines 15-18.

> Thus, since every address is compared with the CAM entries anyway (to filter for multicast messages, SNAP filtering, etc.), and this compare in the CAM is done in parallel with the hash function, the CAM compare is without cost in time or new circuitry.

Spinney, column 14, lines 33-34.

These portions of *Spinney* disclose that packet data communication network hubs are used for switching or routing, that local addresses are inserted in a header, and that every address is compared with the content addressable memory (CAM) entries. *Spinney* does not teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs," as recited in claims 1, 11, and 21. Further, *Spinney* does not even mention queue pairs.

Collier is directed to an apparatus and method for generating and checking a cyclical redundancy check value. A first device calculates a cyclical redundancy check value on a full set of bits of input data to produce a first value and a second device calculates a cyclical redundancy check value on a subset of the full set of bits of input data to produce a second value. One of the values is selected for transmission to a register. The value in the register is fed back to the devices for iterating the cyclical redundancy check value calculation until it has been completed. For checking a cyclical redundancy check value, a comparator compares a calculated, cyclical redundancy check value with the received cyclical redundancy check value or with a constant. See *Collier*, abstract. *Collier* does not mention filtering or identify a queue pair.

In the rejection of independent claims 1, 11, and 21, the Final Office Action refers to the following portions of *Collier*:

> The Infiniband Architecture defines a system area network for connecting multiple independent processor platforms (i.e., host processor nodes), input/output ("IO") platforms, and IO devices.

Collier, column 2, lines 59-62.

> Each channel adapter 112 may provide a plurality of queue pairs, each of which provide an independent virtual communication port for a client. Referring now to FIG. 1(b), these virtual communication ports, for example 120 and 121, support a plurality of serial buffering interfaces referred to as virtual lanes.

Collier, column 3, lines 26-28.

> Data is transmitted between the sending device and the receiving device via the virtual lanes VL_0 -VL_{14} in the form of data packets. A data packet is the unit of information that is routed through the fabric 101.

Collier, column 2, lines 15-17.

These portions of *Collier* only teach that each channel adapter may provide a plurality of queue pairs, each of which provides an independent virtual communication port for a client, and that data is transmitted between the sending and the receiving device via the virtual lanes VL_0-VL_{14} in the form of data packets. *Collier* does not mention **identifying** a queue pair as defined in the claims and does not even mention the word "filter" or elaborate on the use of queue pairs. Further, *Collier* does not teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs," as recited in claims 1, 11, and 21.

Spinney and *Collier* fail to teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs." Therefore, the alleged combination of *Spinney* and *Collier* does not teach or suggest these features, as recited in independent claims 1, 11, and 21.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

One of ordinary skill in the art would not combine *Spinney* with *Collier* when the references are considered as a whole. In considering the references as a whole, one of ordinary skill in the art would take into account the problems recognized and solved. The present invention recognizes the problems associated with using one queue pair for each channel adapter for all IP traffic. *Spinney* and *Collier* do not teach the problem or its source. *Spinney* is directed toward generating shorter addresses for local routing and processing (see *Spinney*, column1, lines 44-56). *Collier* is directed to a variable width parallel cyclical redundancy check for detecting errors in data transmission (see *Collier*, column 1, lines 7-16). One of ordinary skill in the art would therefore not be motivated to combine or modify the references in the manner required to form the solution disclosed in the present invention.

Furthermore, as noted above, there is no teaching or suggestion in the references as to the desirability of including the features from the other references. There is no motivation cited in

Spinney to include the variable width parallel cyclical redundancy check of *Collier*. *Spinney* does not even mention a cyclical redundancy check. Further, there in no motivation in *Collier* to include the method of *Spinney* for handing packets through a hub, switch or router for a network. The Examiner alleges that the motivation would be to use the Infiniband architecture to connect multiple independent processor platforms. Appellants respectfully disagree that this would be a proper motivation for combining *Spinney* and *Collier*. As the Examiner has failed to demonstrate any motivation or incentive in the prior art to combine and modify the references so as to achieve the claimed invention, the alleged combination can only be the result of impermissible hindsight reconstruction using Appellants' own disclosure as a guide. While Appellants understands that all examination entails some measure of hindsight, when the rejection is based completely on hindsight, as in the present case, to the exclusion of what can be gleaned from the references, then the rejection is improper and should be withdrawn.

In view of the above, Appellants respectfully request withdrawal of the rejection of claims 1, 11, and 21 under 35 U.S.C. § 103(a). Additionally, *Spinney* and *Collier*, taken individually or in combination, do not teach or suggest the features of dependent claims 2-4, 10, 12-14, 20, 22-24, and 30 at least by virtue of their dependency on independent claims 1, 11, and 21, respectively. Therefore, Appellants respectfully request withdrawal of the rejection of dependent claims 2-4, 10, 12-14, 20, 22-24, and 30 under 35 U.S.C. § 103(a).

A.2. Claims 4, 14, and 24

In addition to the above, Appellants respectfully submit that claims 4, 14,and 24 are independently distinguishable from the *Spinney* and *Collier* references. Claim 4 depends from claim 1; claim 14 depends from claim 11; and claim 24 depends from claim 21. Claims 4, 14, and 24 additionally recite "identifying the queue pair based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry." *Spinney* does not even mention queue pairs and *Collier* does not teach or suggest identifying a queue pair as recited in the claims. *Collier* only discloses that a channel adapter may have a plurality of queue pairs. Thus, *Spinney* and *Collier* do not teach or suggest the features as described in claims 4, 14, and 24.

A.3. Claims 10, 20, and 30

In addition to the above, Appellants respectfully submit that claims 10, 20, and 30 are independently distinguishable from the *Spinney* and *Collier* references. Claim 10 depends from claim 1; claim 20 depends from claim 11; and claim 30 depends from claim 21. Claims 10, 20, and 30 additionally recite "identifying the queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet includes using a content addressable memory." As stated previously, *Spinney* does not mention queue pairs and *Collier* only discloses that a channel adapter may have a plurality of queue pairs. *Spinney* and *Collier* do not teach or suggest the features as described in claims 10, 20, and 30.

B. GROUND OF REJECTION 2 (Claims 5-9, 15-19, and 25-29)

The Final Office Action rejects claims 5-9, 15-19, and 25-29 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Spinney* in view of *Collier*, and in further view of *Acharya* (U.S. Patent 6,459,698 B1). This rejection is respectfully traversed.

B.1. Claims 5-9, 15-19, and 25-29

Since claims 5-9, 15-19, and 25-29 depend from independent claims 1, 11, and 21, respectively, the same distinctions between *Spinney* and *Collier*, and the invention recited in claims 1, 11, and 21, apply to dependent claims 5-9, 15-19, and 25-29. Specifically, *Spinney* and *Collier*, taken individually or in combination, do not teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs." In addition, *Acharya* does not provide for the deficiencies of *Spinney* and *Collier* with regard to independent claims 1, 11, and 21.

Acharya is directed to supporting mapping of layer 3 priorities in an InfiniBand network. A router is configured for sending and receiving data packets on an InfiniBand network and acts as a bridge between an IP network and the InfiniBand network. The router is configured to receive an Internet Protocol (IP) data packet having an IP header including a type of service (TOS) field having a differentiated service code point indicative of layer 3 priority data of the IP

packet. The router includes a mapping table having multiple entries, each entry specifying a differentiated services code point and a corresponding service level. The controller is configured for parsing the TOS field and determining the service level for the differentiated services level. The controller outputs the IP packet on the InfiniBand network within an InfiniBand packet according to the services level. See *Acharya*, abstract. *Acharya* does not teach or suggest "identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs," as recited in claims 1, 11, and 21. Thus, Appellants respectfully request withdrawal of the rejection of dependent claims 5-9, 15-19, and 25-29 under 35 U.S.C. § 103(a).

Further, one of ordinary skill in the art would not combine *Spinney* and *Collier* with *Acharya* when the references are considered as a whole. In considering the references as a whole, one of ordinary skill in the art would take into account the problems recognized and solved. The present invention recognizes the problems associated with using one queue pair for each channel adapter for all IP traffic. *Spinney*, *Collier*, and *Acharya* do not teach the problem or its source. *Spinney* is directed toward generating shorter addresses for local routing and processing (see *Spinney*, column1, lines 44-56). *Collier* is directed to a variable width parallel cyclical redundancy check for detecting errors in data transmission (see *Collier*, column 1, lines 7-16). *Acharya* is directed toward supporting mapping of layer 3 priorities in an InfiniBand network (see *Acharya*, column 2, lines 10-14). One of ordinary skill in the art would therefore not be motivated to combine or modify the references in the manner required to form the solution disclosed in the present invention.

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CLAIMS APPENDIX

The text of the claims involved in the appeal are:

1. A method of routing data packets to a queue pair, comprising:

receiving a data packet having a header in which one or more Internet Protocol filter values are identified;

identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs; and

routing the data packet to the identified queue pair.

2. The method of claim 1, wherein identifying the queue pair includes:

generating a hash value based on the one or more Internet Protocol filter values; and

retrieving a hash table entry based on the hash value.

3. The method of claim 2, further comprising:

determining if a collision bit in the hash table entry is set; and

retrieving a collision table entry corresponding to the hash table entry if the collision bit is set.

4. The method of claim 3, further comprising:

comparing the one or more Internet Protocol filter values in the header of the data packet to filter values in the collision table entry; and

identifying the queue pair based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry.

5. The method of claim 1, wherein the method is implemented in a host channel adapter set up to support filtering.

6. The method of claim 5, wherein the host channel adapter is set up to support filtering by using a Modify HCA verb to enable filtering in the host channel adapter.

7. The method of claim 1, wherein the queue pair is a queue pair that is set up to support filtering by using a Modify QP verb to enable filtering.

8. The method of claim 7, wherein the Modify QP verb identifies the filter value for each filter type enabled from filter types supported by a corresponding host channel adapter.

9. The method of claim 1, wherein the one or more Internet Protocol filter values are Internet Protocol over InfiniBand transport and/or network layer filter values.

10. The method of claim 1, wherein identifying the queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet includes using a content addressable memory.

11. A computer program product in a computer readable medium for routing data packets to a queue pair, comprising:

first instructions for receiving a data packet having a header in which one or more Internet Protocol filter values are identified;

second instructions for identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs; and

third instructions for routing the data packet to the identified queue pair.

12. The computer program product of claim 11, wherein the second instructions for identifying the queue pair include:

instructions for generating a hash value based on the one or more Internet Protocol filter values; and

instructions for retrieving a hash table entry based on the hash value.

13. The computer program product of claim 12, further comprising:

instructions for determining if a collision bit in the hash table entry is set; and

instructions for retrieving a collision table entry corresponding to the hash table entry if the collision bit is set.

14. The computer program product of claim 13, further comprising:

instructions for comparing the one or more Internet Protocol filter values in the header of the data packet to filter values in the collision table entry; and

instructions for identifying the queue pair based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry.

15. The computer program product of claim 11, wherein the computer program product is executed in a host channel adapter set up to support filtering.

16. The computer program product of claim 15, wherein the host channel adapter is set up to support filtering by using a Modify HCA verb to enable filtering in the host channel adapter.

17. The computer program product of claim 11, wherein the queue pair is a queue pair that is set up to support filtering by using a Modify QP verb to enable filtering.

18. The computer program product of claim 17, wherein the Modify QP verb identifies the filter value for each filter type enabled from filter types supported by a corresponding host channel adapter.

19. The computer program product of claim 11, wherein the one or more Internet Protocol filter values are Internet Protocol over InfiniBand transport and/or network filter values.

20. The computer program product of claim 11, wherein the second instructions for identifying the queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet include instructions for using a content addressable memory.

21. An apparatus for routing data packets to a queue pair, comprising:

means for receiving a data packet having a header in which one or more Internet Protocol filter values are identified;

means for identifying a queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet, wherein a single channel adapter supports the plurality of queue pairs; and

means for routing the data packet to the identified queue pair.

22. The apparatus of claim 21, wherein the means for identifying the queue pair includes:

means for generating a hash value based on the one or more Internet Protocol filter values; and

means for retrieving a hash table entry based on the hash value.

23. The apparatus of claim 22, further comprising:

means for determining if a collision bit in the hash table entry is set; and

means for retrieving a collision table entry corresponding to the hash table entry if the collision bit is set.

24. The apparatus of claim 23, further comprising:

means for comparing the one or more Internet Protocol filter values in the header of the data packet to filter values in the collision table entry; and

means for identifying the queue pair based on the comparison of the one or more Internet Protocol filter values in the header of the data packet to the filter values in the collision table entry.

25. The apparatus of claim 21, wherein the apparatus is part of a host channel adapter set up to support filtering.

26. The apparatus of claim 25, wherein the host channel adapter is set up to support filtering by using a Modify HCA verb to enable filtering in the host channel adapter.

27. The apparatus of claim 21, wherein the queue pair is a queue pair that is set up to support filtering by using a Modify QP verb to enable filtering.

28. The apparatus of claim 27, wherein the Modify QP verb identifies the filter value for each filter type enabled from filter types supported by a corresponding host channel adapter.

29. The apparatus of claim 21, wherein the one or more Internet Protocol filter values are Internet Protocol over InfiniBand transport and/or network filter values.

30. The apparatus of claim 21, wherein the means for identifying the queue pair in a plurality of queue pairs based on the one or more Internet Protocol filter values in the header of the data packet includes means for using a content addressable memory.

EVIDENCE APPENDIX

There is no evidence to be presented.

RELATED PROCEEDINGS APPENDIX

There are no related proceedings.